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Analysis of fish emulsions and effect on aquaponics cultures

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Short history:

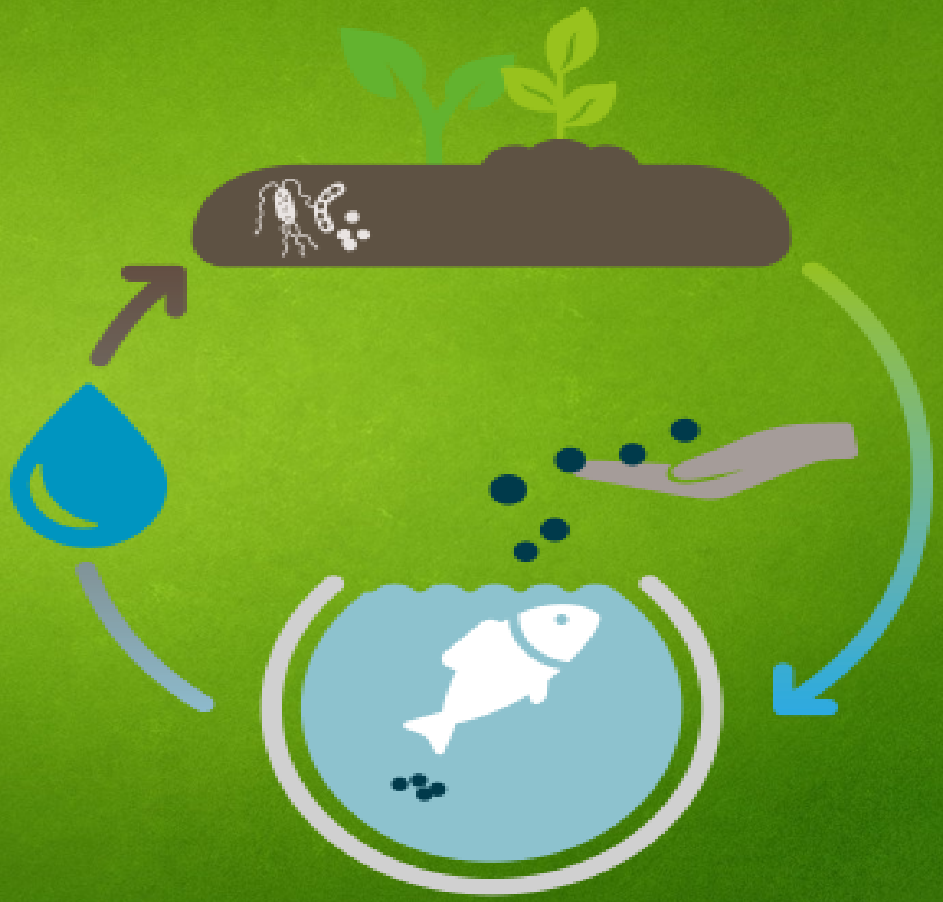
- While most people know that Aquaponics is the combination of Aquaculture and Hydroponic, rather fewer know much of how it came about.

- The notion of using fish wastes to fertilize plants (the fundamental premise of aquaponics) has its roots in early Asian and South American civilizations.

- The ancient Aztecs built „chinampas” (networks of canals and stationary artificial islands) in which they cultivated crops on the islands using nutrient-rich mud and water from the canals.

Growing form and capacity of aquaponics system:

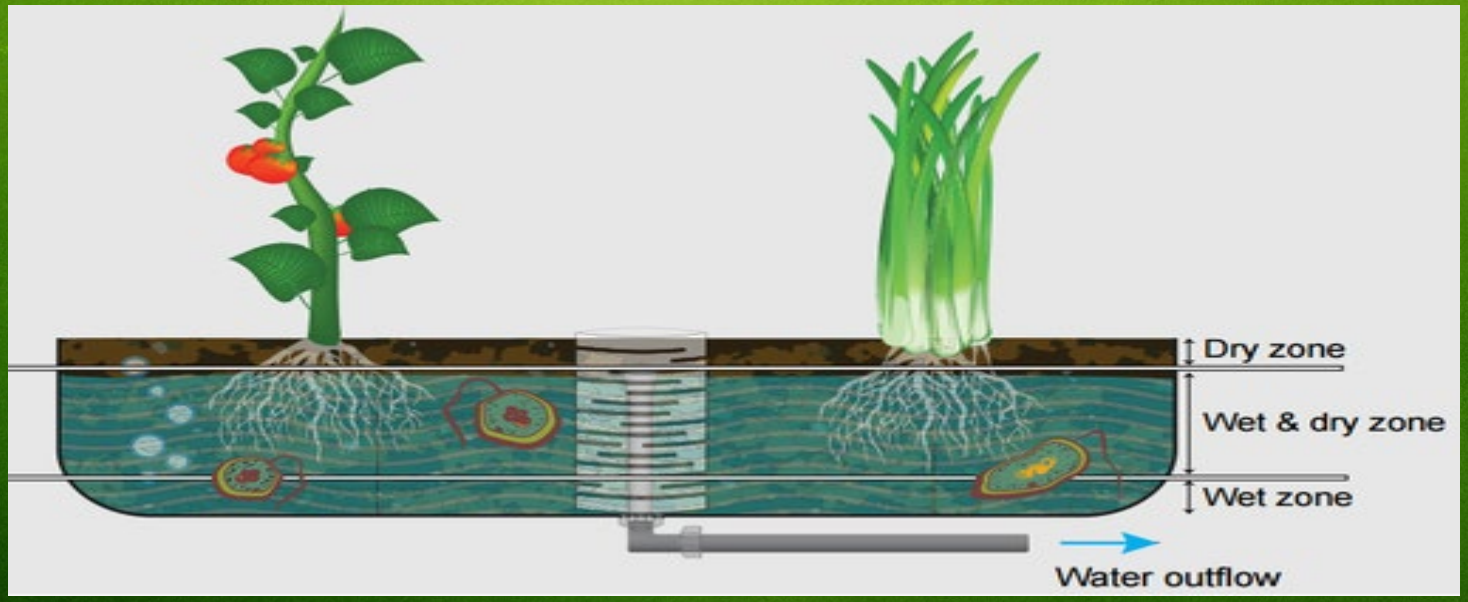
- Aquaponics uses a linked system of fish tanks and vegetables beds.
- The basic system involves pumping the water from the fish tank, complete with the emulsion of the fish, into the vegetable beds.



- Three major growing forms of aquaponics systems:

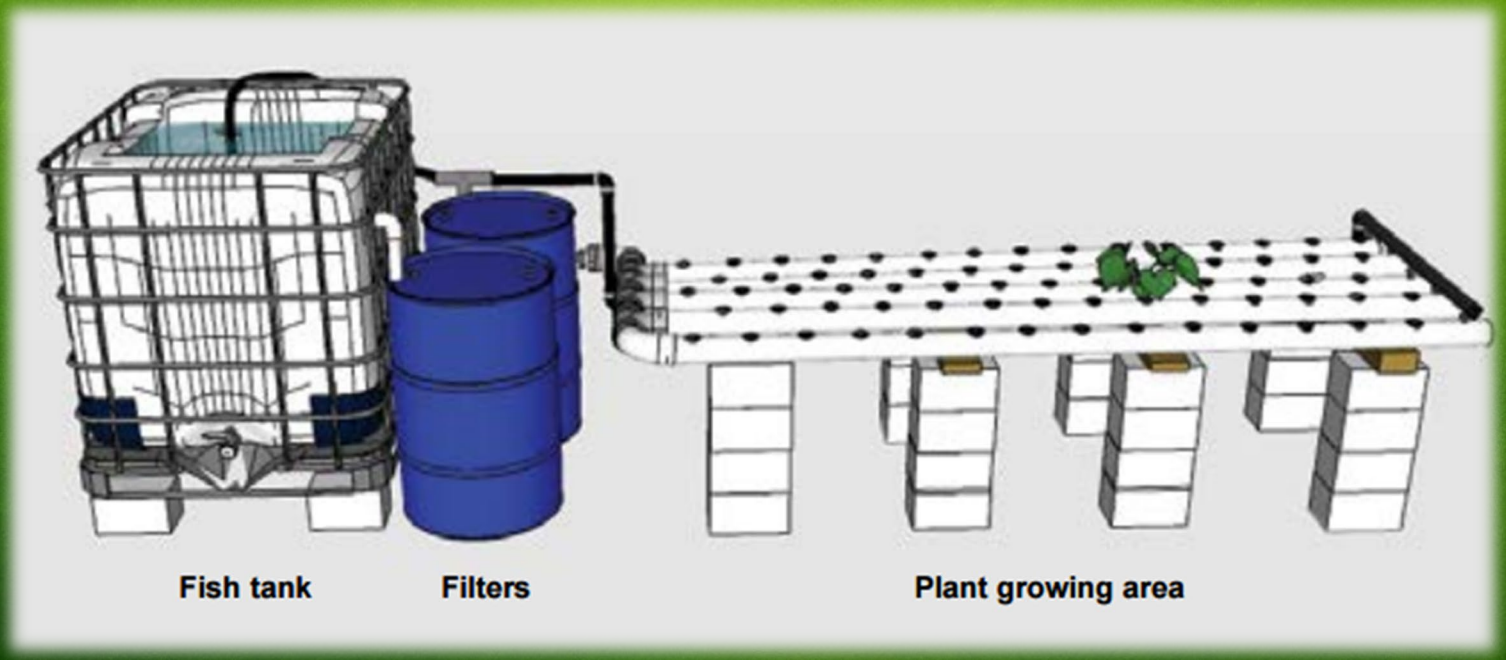
Media beds:

- Easiest to setup
- It consists of garden beds filled with small porous rocks – typically clay pellets
- The porous rocks layers allows the efficient nutrient uptake,remain aerated and also serve to filter out biological organisms.



Nutrient film technique:

- Setting a series of pipes adjoining to the fish tank and pumping water through them as a very thin film
- Extra filtration equipment is needed to clear the water of solid and biological waste before it is returned.
- Used in large-scale to produce tons of food.



Deep water culture:

- Involves siting the plants on rafts through which their roots protrude and hang in the nutrient-rich water from the fish tank
- The water must be filtered
- The equipment required is minimal and can be sourced cheaply

- Beside the 3 major forms of aquaponics system,there are 3 sizes:

a. Small capacity system

b. Medium capacity system

c. Large capacity system

Types of fish used:

- 2 local fish species: Carp and Caras

❖ 1.Carp (*Cyprinus carpo*):

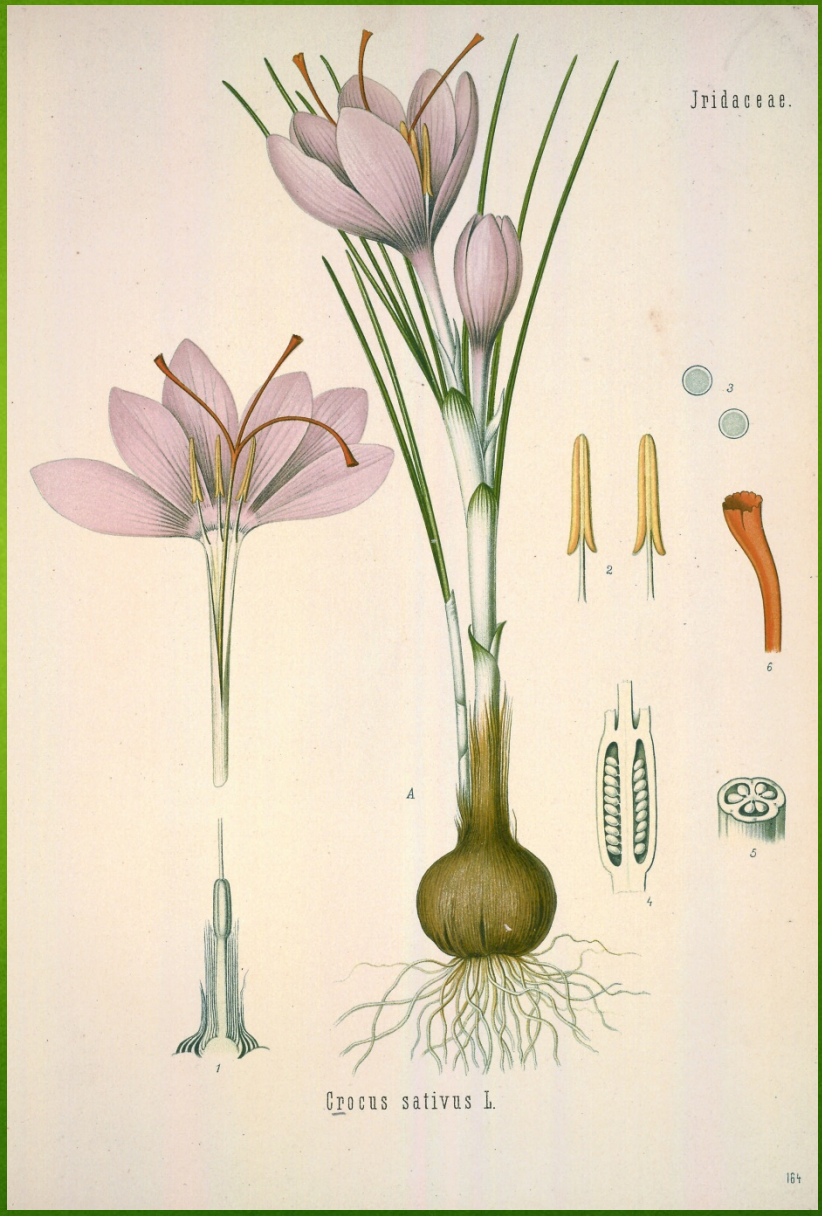
- Temperature range: 15-25°C
- Time to one pound: 1 year
- Ph range: 6 to 8

❖ 2.Caras (*Carassius gibelio*):

- Temperature range: 3 -40 °C
- Time to one pound: 2 year
- Ph range: 6 to 8

Cultivated plant:

- The world's legendary spice – Saffron in his scientific name *Crocus sativus Linne*
- Best known for producing the spice saffron
- *Crocus sativus* has a corm, which holds leaves, bracts, bracteole, and the flowering stalk
- The plant grows about 10 to 30 cm high
- The corms are planted 10 cm apart and in a trough 10 cm deep.



Used substrate:

- Filling the aquaponics growing beds in 3 layers:

- First layer: 5 cm of small river rock
- Second layer: 3-5 cm of aquarium sand
- Third layer: 10-15 cm of clay granules

LED light in the aquaponics culture:

- Most effective means to supplement lighting even fully replace sunlight in an indoor growing space
- Eliminate plant responses to photoperiod
- Provide stable high quality lighting year round

Chemical analyses:

- Analized chemicals:

- pH level
- Electrical conductivity (EC)
- Mineral elements
- Total nitrogen (TN)
- Ammonium
- Nitrite
- Nitrates
- Total organic carbon

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Harvest green and clean!

Thank you!